Non-destructive coils and field shapers for high magnetic field industrial application

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High magnetic field pulse, despite its proven advantages, has still not been widely adopted in industrial application-mainly because the critical parameter of work-coil service life. PULSAR research and development works aimed to create suitable work-coils (solenoids) for industrial use are reported here. The material and geometry considerations are addressed. One-turn coils with or without power-pulse transformers were designed, manufactured and tested at a wide range of both dimensions and work regimens, including water cooling and air cooling systems. A contact system for the coil out at peak current of about 1 MA has been developed and tested too. Magnetic field distribution has been checked as well, and water cool solenoid tested to 50 000 pulses life time at 25 T and 4 pulse/min.